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Technical Trend Analyses of Indonesia Stock Exchange Index

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- The stock exchange index is one of the primary barometers for the economic health of a country. The index encapsulates the performances of a wide spectrum of economic sectors, and it vividly reflects the country's economic condition.

- In this paper, we apply several commonly used approaches to conduct technical trend analyses of the IDX and assess the outlook in the near future.

- Several trends can be highlighted. Market sentiment in the capital market of Indonesia has generally improved from bearish environment in late 2022 into a relatively bullish one in late 2023. Based on the technical trend analyses, we can also conclude that the Indonesia Stock Index has entered overbought position at the end of 2023 from the previously oversold position in March-April 2022.

- For 2024, we see the upside potential of IDX to hover between 7400-8600 range.

The Stock Market in Indonesia

A. Background

The stock exchange index is one of the primary barometers for the economic health of a country. The index encapsulates the performances of a wide spectrum of economic sectors, and it vividly reflects the country's economic condition. This is also true for the Indonesia stock exchange index (IDX), showcasing the performances of the companies from the traditional sectors such as agriculture to the 'new economy sectors' such as e-commerce, start-ups and other digital firms.

IDX also represents the landscape of the local economy. For the financial sector of Indonesia, banking industry plays a predominant role in the day-to-day IDX movements. Similarly, several electronic and textile firms contribute a major weigh on the manufacturing sector of the IDX. The recent volatilities of the major export-oriented commodity firm stock indices mirror the global commodity trends. The IDX has also captured the shifts in the behavior of the Indonesian population.

In this paper, we apply several commonly used approaches to highlight technical trends of the IDX and assess the outlook in the near future.

B. Selected Key Trends of Jakarta Composite Index

Several events were responsible to the volatilities of the IDX in the past decades. Three episodes of notable falls in the IDX were the 2008 US property crises; the global economic slowdown accompanied by commodity price fall in 2016 and the 2020 Covid-19 episode (Exhibit 1). The sell-offs however were often short-lived as relatively strong rebounds took place almost immediately within 4 weeks following the lowest reported index level in March 2020 at 4538 index point. Post March 2020, the IDX composite index increases around 500 index points for only 4 months. The recent IDX volatilities have partly been driven by the swings in the energy index, which has seen a significant pick-up from around 737 index points in May 2021 to around 2100 on December 2023. On the other hand, basic material, and industrial move steadily around 1167 - 1302 (basic material) and 971 – 1100 for industrial.

Exhibit 1. Trend of IDX Composite index and Its Volume
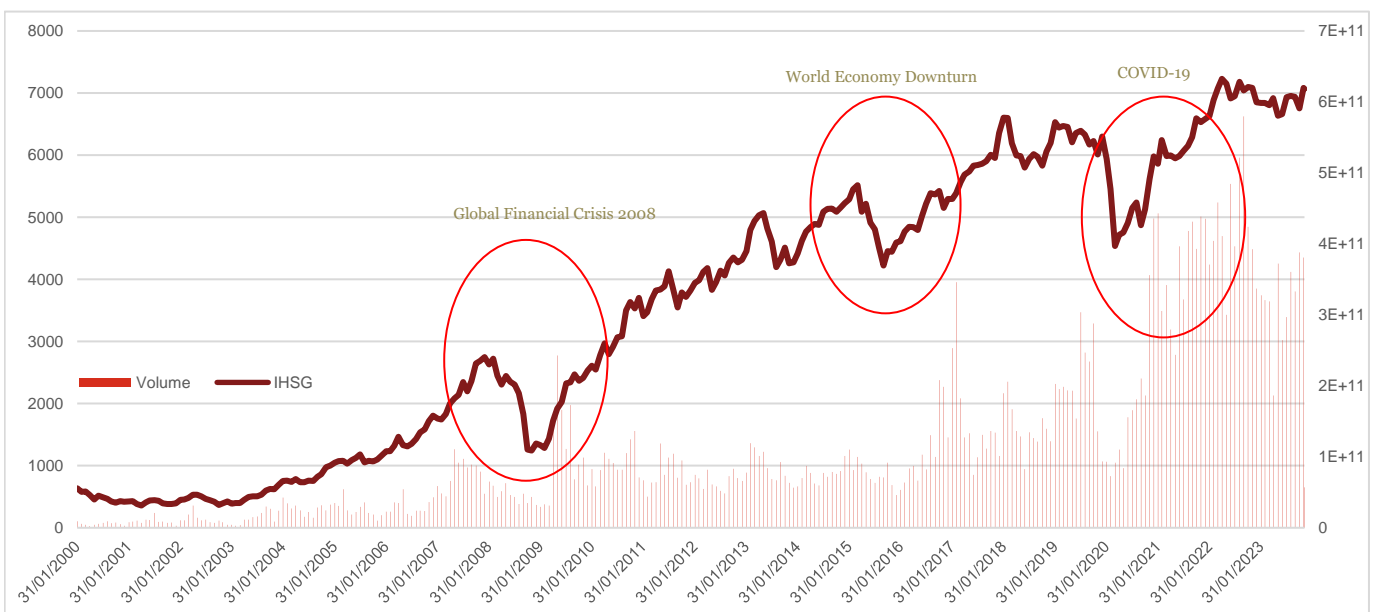
Source: Bloomberg, IFG Progress

### B. Technical Indicators for Trend Analysis

Understanding the volatility, direction and strength of stock index trend helps many stakeholders to manage risk and capitalize gains from the market movements. Several technical indicators are commonly used for the analyses. We apply 6 technical indicators to assess the performance, volatility and potential path of the IDX composite Index in the near future. To note here, we apply monthly data analyses in this study for illustration purposes. The period frequency can be extended further to weekly or even daily.

1. **Moving Average Convergence Divergence (MACD)[1]:**
   MACD is a tool used to diagnose changes in direction, strength, and momentum of stock exchange index. MACD consists of 3 main series of historical stock price/index. Those series are:
   a. MACD Line/Series: This is the primary series calculated by subtracting the 26-periods (months) Exponential Moving Average (EMA) from 12-periods (months) EMA.
   b. Signal Line/Series: A 9-periods (months) EMA of MACD Line.
   c. MACD Histogram: It is the difference between MACD Line/Series and the Signal line/Series.

Exhibit 2. Moving Average Convergence Divergence (MACD) of IDX Composite Index
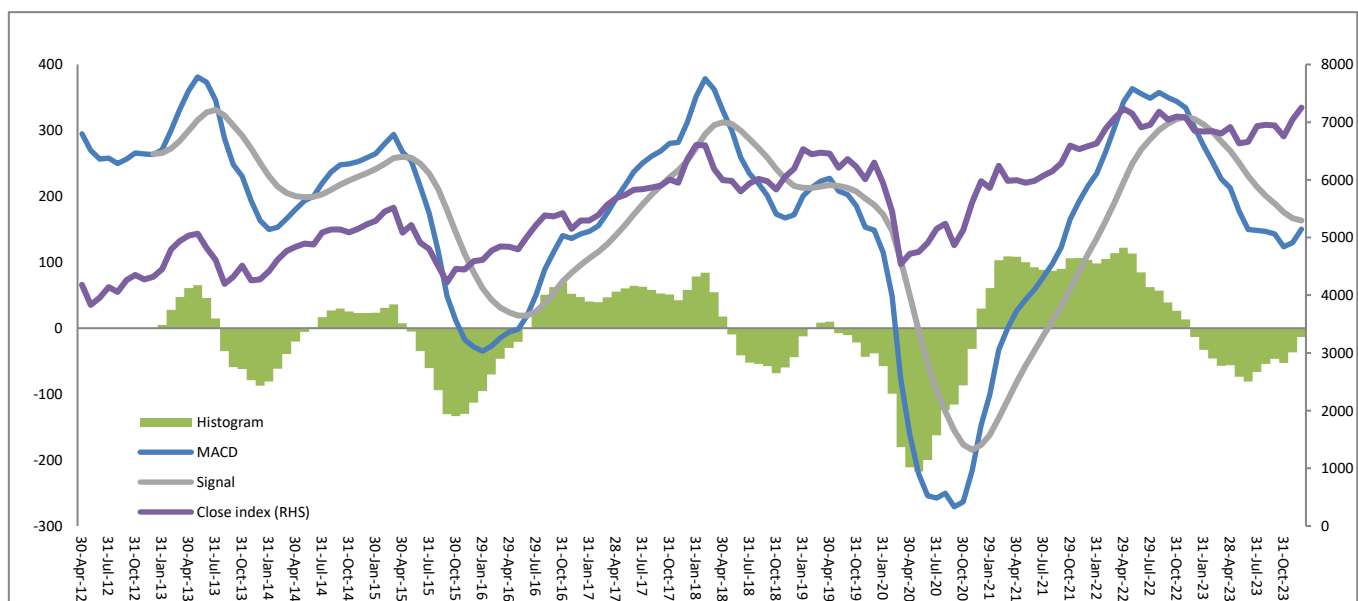
Source: *Bloomberg, IFG Progress*

Exhibit 2 shows the MACD series. When the Signal line is higher than MACD line, resulting in negative histogram, we can conclude that the IDX composite index is experiencing a bearish trend. Since late 2022, IDX reported bearish sentiment, albeit steady recovery toward less bearish taking place in late 2023.

2. **Bollinger Bands[2]:**

   Bollinger bands measure volatility and potential overbought or oversold positions at the market. Bollinger bands consist of 3 lines (middle band, upper band, and lower band). Middle band is a simple moving average (SMA) for the 20 periods (months). The upper band is calculated by adding a standard deviation multiplier (in this case, we set the multiplier at one) to the middle

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[1] Chio, P. T. (2022). A comparative study of the MACD-base trading strategies: evidence from the US stock market. *arXiv preprint arXiv:2206.12282*.
[2] Chen, S., Zhang, B., Zhou, G., & Qin, Q. (2018). Bollinger bands trading strategy based on wavelet analysis. *Applied Economics and Finance*, *5*(3), 49-58.

band. The Lower band is calculated by subtracting one standard deviation from the middle band. If the stock price/index breaks the upper band, this implies that the stock is overbought, and vice versa. The position of overbought implies that investors may need to sell the stock.

**Exhibit 3. Bollinger bands of IDX Composite Index**
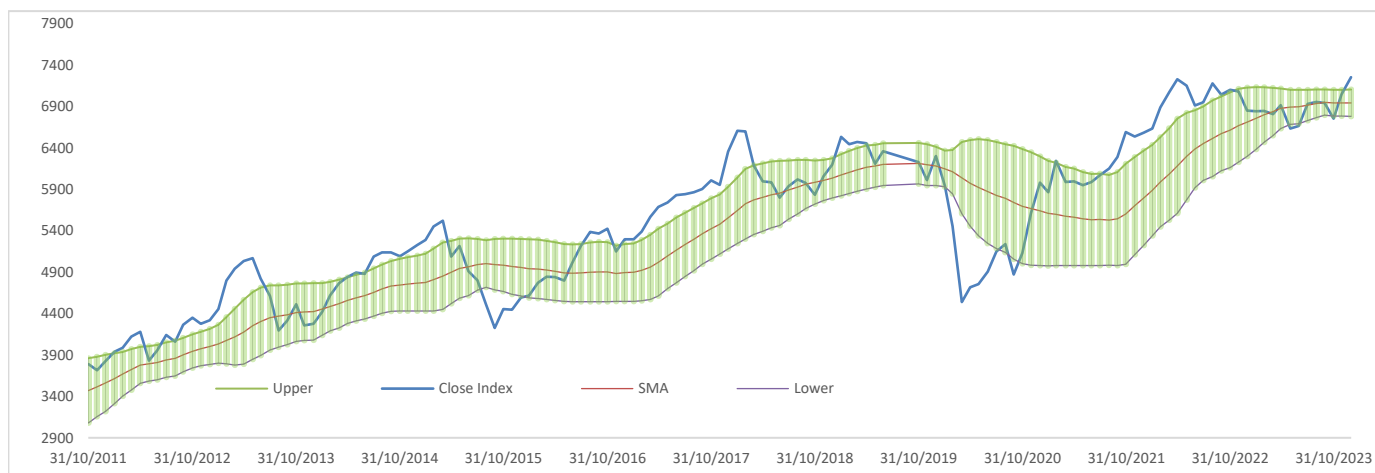
Source: *Bloomberg, IFG Progress*

The green area of exhibit 3 represents the degree of the IDX volatility during the past several years. As shown in exhibit 3, the market volatility has more than doubled during the Covid-19 period from the average level reported in 2018-2019. However, at the second half of 2023, the volatility of IDX has fallen to the level even below reported in 2019. We also notice that the IDX has broken the resistance line (upper band) in late 2023, suggesting a pick-up of the market sentiment and that the market was overbought. In addition, the smaller green area in late 2023 also suggests a stronger conviction among the traders on the overall Indonesia stock exchange index.

3. **Relative Strength Index (RSI)[3]**

Relative Strength Index (RSI) is a commonly applied momentum indicators used in technical analysis to observe the change in the price direction. It measures the price change in a certain period for evaluating the potential overbought or oversold status of the stock within a certain window of time (14 months). RSI has a line index with the value from 0 to 100. Index value below 30 means that the market is oversold (undervalued), it suggests a potential uptrend reversal. On the other hand, RSI above 70 indicates that the market is overbought and there is a potential downtrend.

Exhibit 4. Relative Strength Index (RSI) of IDX Composite Index
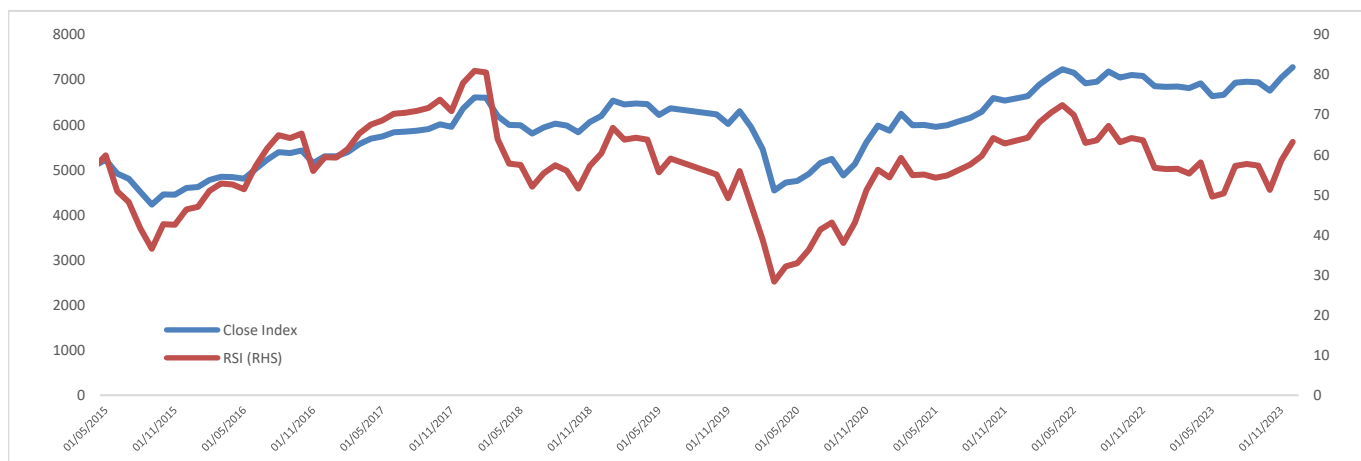
Source: *Bloomberg, IFG Progress*

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[3] Adrian, R. M. (2011). The relative strength index revisited. *African Journal of Business Management*, *5*(14), 5855-5862.

Exhibit 4 indicates that RSI touched the level close to 30 following the outbreak of Covid-19 pandemic around late March-early April 2020, capturing the oversold position in the market. By the end of 2023, the RSI hovered between 50 and 70 range, with a pick-up trend toward the end of 2023. The end of last year trend was a warning/ a signal of the potential overvalued/overbought market condition.

4. Average True Range (ATR)[4]

Average True Range (ATR) is a technical indicator to measure market volatility. The range of volatility is relative to the entire range of price index (open, high, low, and close price index). ATR is calculated as the average of one of the alternative measures:

   a. The difference between current high and current low stock price index.
   b. The difference between previous close and current high stock price index.
   c. The difference between previous and current low stock price index.

ATR is calculated by averaging the true range over the specified number of periods (14 months).

Exhibit 5. Average True Range (ATR) of IDX Composite Index
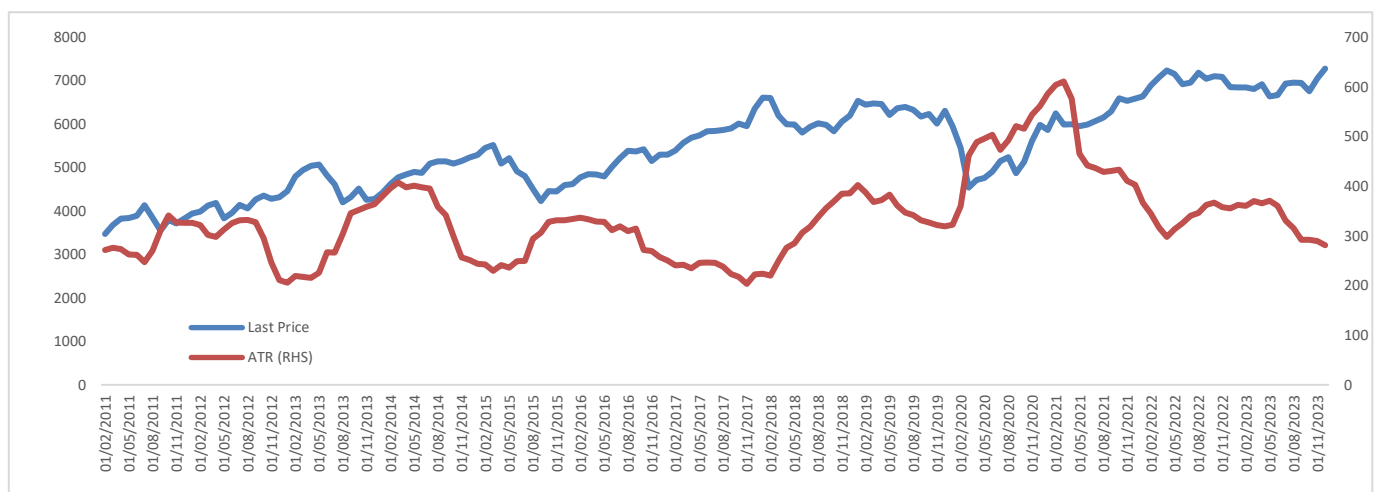
Source: *Bloomberg, IFG Progress*

Exhibit 5 shows that the ATR has persistently climbed from the start of the Covid-19 in March 2020 to the beginning of 2021, capturing the rise in the volatility. A sharp reversal took place in early 2021. The ATR started to decline at the beginning of 2021 and continued to the end of 2023, often seen as a signal to buy.

5. Parabolic Stop and Reverse (PSAR)[5]

Parabolic Stop and Reverse (PSAR) is another technical tool used to determine the potential direction of a stock index momentum. PSAR also captures the entry or exit of investor. PSAR is calculated based on the high and low stock index price. The interpretation PSAR is compared to realized stock index whether the PSAR is above or below the stock index. If the PSAR dots start to move below the stock index, it demonstrates the potential uptrend for stock index. If the PSAR dots start to move above the stock index, it indicates that there is a potential downtrend of the stock index.

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[4] Lim, S. Y., Soh, Z. K., & Zhou, X. (2012). A study of trading strategies: average true range.
[5] Agustin, I. N., & Fariono, F. (2023). Perbandingan Analisis Teknikal dengan Pendekatan Moving Average dan Parabolic SAR dalam Memprediksi Pengembalian Saham pada Indeks Saham LQ45. *Ekonomis: Journal of Economics and Business*, *7*(1), 606-613.

Exhibit 6. Parabolic Stop and Reverse (PSAR) of Jakarta Composite Index

Source: *Bloomberg, IFG Progress*

Exhibit 6 shows the break point at the end of 2023. It indicates that there is a potential uptrend of IDX composite index in the following period, and therefore points to 'entry' of more investors into the Indonesia stock exchange.

C. Forecasting Trajectory of IDX Composite index in 2024

The future trajectory of IDX Composite index performance is linked to both domestic and international market dynamics. In general, market expects for the P/E ratio to eventually revert to long-term equilibrium[6]. P/E ratio is derived from the price or value of stock index with the earning per share.

According to Goud & Reddy (2020)[7], the formula of P/E ratio is:

- $Price\ to\ Earnings\ Ratio\ \left(\frac{P}{E}Ratio\right) = Market\ Value\ Per\ Share/$
  $Earning\ Per\ Share\ (EPS)$ (1)
- $Market\ Value\ Per\ Share =$
  $Price\ to\ Earnings\ Ratio\ \left(\frac{P}{E}ratio\right)\ x\ Earning\ Per\ Share\ (EPS)$ (2)

When the stock price goes up, boosting the market value, earning per share (EPS) is expected to increase also and the overall P/E ratio is therefore expected to remain stable at its long-term value. Shiller (2000)[8] explains that the consequence of high P/E will be followed by big sell offs and low return in the future. Eventually, the price decreases to maintain the P/E ratio.

Exhibit 7 shows that the P/E of IDX Composite index between 2011 – 2023, in average, hovered below the baseline. Moreover, post Covid-19 shows that the adjusted P/E ratio fluctuated around -1 standard deviation. It can be concluded that P/E going up above +1 standard deviation and falling below -1 standard deviation are rare events unless there are extraordinary events or shocks such commodity shock or pandemic COVID-19. We use this relatively stable P/E ratio to predict the future IDX Composite index.

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[6] Ali, M. (2017). Movement of PE ratio and its impact on price fluctuations: a case study of Dhaka Stock Exchange in Bangladesh. Global Journal of Management and Business Research, 17(1), 1-9.
[7] Goud, R. G., & Reddy, M. K. (2020). FORECASTING OF P/E RATIO FOR THE INDIAN EQUITY MARKET STOCK INDEX NIFTY 50. International Journal of Agricultural & Statistical Sciences, 16(2).
[8] Shiller, R. J. (2000). Irrational exuberance princeton. *Prunceton University Paper.*

Exhibit 7. Standard Deviation Band of IDX Composite Index
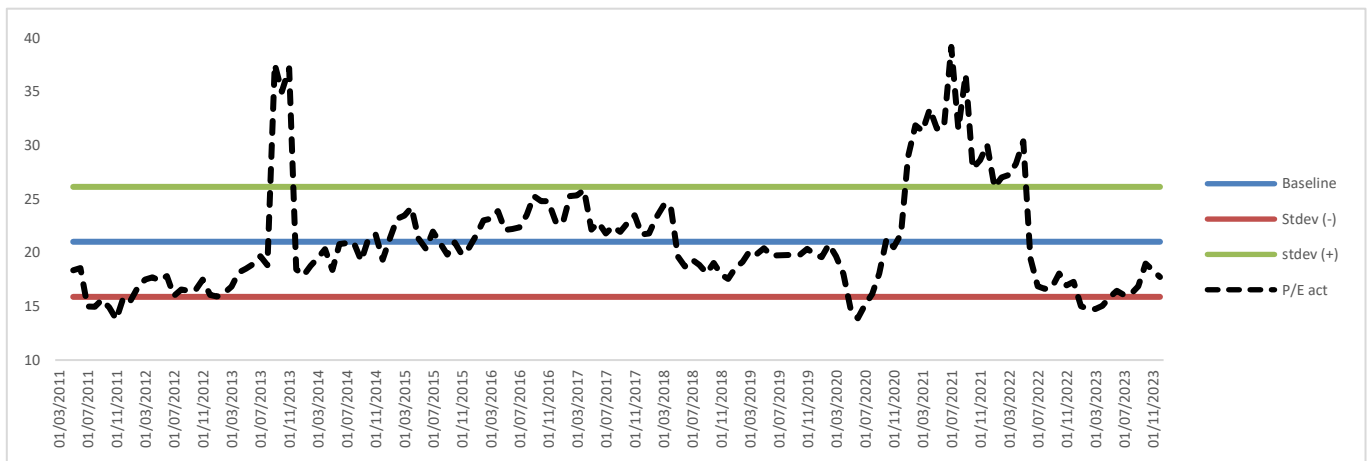
Source: *Bloomberg, IFG Progress*

To forecast the value range of the IDX composite index in the future, we apply a model with the assumption that P/E goes back to long run equilibrium and the market adjusts by itself in the long run. We use monthly data of adjusted Price/Earnings ratio and estimated Earnings per Share (EPS) of IDX composite index. The set of data used in the paper is collected from Bloomberg by the end of December 2023 with the period of 2011 - 2023.

a. Standard Deviation Band[9]

Standard deviation band is a frequently used financial analysis method to assess market sentiment. This tool is based on standard deviation of 6 months to 5 years. We include base numbers as the averages of the adjusted P/E ratio for the period of 6 months to 5 years. The upper band (max) is the sum of the average of P/E ratio and +1 standard deviation, and lower (min) band is calculated by subtracting the average of adjusted P/E with -1 standard deviation. Exhibit 12 reports the ranges of min to max bounds for the various window periods of 6 months to 5 years. The period covered in this section is between Januari 2018 to December 2023 with monthly data.

Exhibit 8. Standard Deviation Band of estimated P/E of IDX Composite Index 2024

P/E	Min	Base	Max
Estimated P/E (6 Months)	16.5570	17.5782	18.5994
Estimated P/E (1 year)	15.2322	16.6151	17.9979
Estimated P/E (2 year)	14.1687	18.6427	23.1167
Estimated P/E (3 year)	15.4204	22.8613	30.3021
Estimated P/E (4 year)	15.0055	21.9394	28.8733
Estimated P/E (5 year)	15.1498	21.4453	27.7407

Source: *Bloomberg, IFG Progress*

Exhibit 8 shows estimated P/E for 2024 based on 6 months to 5 years of average P/E ratio. To calculate estimated P/E (6 months), for instance, we utilize the average historical adjusted P/E data over these six months (July 2023 – December 2023) to determine the base value that will serve as a reference in estimating the estimated P/E ratio (6 months). We sum the base value with standard deviation of adjusted P/E (6 months) to get the max value of estimated P/E (6 Months). To get the min value of estimated P/E (6 months), we subtract the base value with standard deviation of adjusted P/E (6 months). Another example is computing estimated P/E (3 years). We do the same step as estimated P/E (6 months) with different time frame (December 2020 – December 2023). The overall range of 'Min' estimated P/E is between 14.168 – 16.557. To forecast the stock index, we calculate P/E times expected EPS in 2024. We collect the available EPS forecast for 2024 from Bloomberg with reporting date at of the end of December 2023 with value of 525,01.

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[9] Rousseau, R., & van Rensburg, P. (2003). Time and the payoff to value investing. *Journal of Asset Management*, *4*, 318-325.

Exhibit 9. Estimated IDX Composite Index 2024 based on Standard Deviation Band

	Min	Base	Max
Estimated IDX Composite Index (6 Months)	**8692.593**	9228.738	9764.884
Estimated IDX Composite Index (1 year)	**7997.061**	8723.077	9449.094
Estimated IDX Composite Index (2 year)	**7438.709**	9787.610	12136.512
Estimated IDX Composite Index (3 year)	**8095.867**	12002.387	15908.907
Estimated IDX Composite Index (4 year)	**7878.033**	11518.392	15158.750
Estimated IDX Composite Index (5 year)	**7953.782**	11258.974	14564.165

It assumes that EPS (end of 2024) is 525,01 based on market consensus accessed on Bloomberg in the end of December 2023.
Numbers in the bracket show the estimated P/E by using standard deviation bands.
*Source: Bloomberg, IFG Progress*

Based on the market consensus assumption from Bloomberg, we estimate in 2024, the 'Min' range of IDX Composite is 7438 – 8692 for 2024. We select the min number to get the conservative forecast range of the IDX in 2024 (Exhibit 9).

E. Summary

IDX composite index is one of the key capital market indicators. In this study, we employ several tools to conduct technical trend analyses and to forecast IDX composite index in 2024. Several trends can be highlighted. Market sentiment in the capital market of Indonesia has generally improved from bearish environment in late 2022 into a relatively bullish one in late 2023. Based on the technical trend analyses, we can also conclude that the Indonesia stock index has entered overbought position at the end of 2023 from the previously oversold position in March-April 2022. Furthermore, we see potential uptrend with relatively lower volatility in 2024, with the range of IDX composite index between 7438 – 8692.

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